

Episode 5 – Let us learn from the past

Vigyan Prasar Radio Serial Climate Change

Script: Shri Janardhanan

Characters

Lakshmi	A resident of Haritha housing colony – Home Maker
Krishnan	A retired bank employee – Husband of Lakshmi
Thomas	Haritha housing colony Resident’s association secretary – A Government employee
Mary	Wife of Thomas – A primary school teacher
Ekbal	Village Officer
Rajan	Volunteer Leader – B. Tech Final Year Student

School Principal, Volunteers, Flood victims etc.

Scene 1

Haritha Housing Colony – Lakshmi’s House

Time: 6 am

Sound of Torrential Rain; Thunder

Lakshmi:- Oh God, What a rain one drop is one potful of water. Krishna it seems that our housing colony will be flooded today night. Cold wind is blowing too.

Krishnan:- Dear you please go inside. We have been staying here for the last 30 years. Till now our colony had never been inundated. Hope this time also we will be spared.

Lakshmi:- Let us call our security man to help us transfer TV, Fridge and other things upstairs. Oh, our road is already submerged.

Krishnan:- Just wait! Put on the TV. Let us hear the latest news.

Lakshmi (After putting on the TV)

Listen

News from TV

“Kerala floods: Life comes to a Stand Still”

Life has come to a stand-still in Kerala with flood and landslides leading to unforeseen miseries and chaos. All major rivers are overflowing. Many dams including the big Iduki dam has been opened. The series of landslides and similar accidents caused many deaths in two days. Over 1.67 lakh people have

been evacuated from their houses and put in 1165 relief camps, functioning in the state: This is the worst natural disaster, the state of Kerala has ever seen.

Krishnan:- Here is the security man. He will help me to transfer all these electric and electronic equipment upstairs. Now put off the TV.

Lakshmi:- OK. Please listen to the loudspeaker announcement. One Government vehicle is coming. The announcement comes from that vehicle.

Announcement

Dear Residents, for the last two days we are witnessing torrential rains. All our rivers are overflowing. Two dams in our district have been opened. There are landslides too. There is every chance that this housing colony will be submerged at any time from now. So, all of you have to vacate your houses at the earliest. We have arranged transport facility to take all of you to a safe place. Please cooperate with us for your safety.

Lakshmi:- I think it is better to leave this place. I shall pick few essential things including dresses in a bag. It is better to put off the main switch.

Krishnan:- That is good.
Let me call our Secretary Thomas. What he is up to
(Loudly) Thomas, Thomas

Thomas :- (In a loud voice)
Krishnan sir, I am hearing you. Myself and Mary have decided to leave. I am asking all the residents to do so. Volunteers from National Service Scheme of the local college are here to help us.

Lakshmi:- Oh, Thank God

Krishnan:- Water is gushing inside our house. Now water has risen up to waist level in the road. If we don't leave now it would be dangerous.

Mary:- Lakshmi amma, start now these smart young men will help us to cross the water.

Thomas:- Now all the people agreed to leave the house as per the directions from revenue authorities.

Rajan:- Respected residents. I am Rajan, leader of the National Service Scheme volunteers. Now we are taking you to the main road, where water has not entered yet. Two state transport buses are waiting for you there. These buses will take you to Sri Vivekananda Higher Secondary School where a relief camp was started two days back.

Thomas:- Now all of us have safely crossed the waterlogged road. Please enter the bus, children and elders first.

Rajan:- Drivers. Let us make a move

Lakshmi:- Rajan, Most of us have not taken their breakfast. The children are very hungry. What shall we do?

Rajan:- Amma, don't worry. As soon as you reach the relief camp, the breakfast will be served. If any of you want to go to your relatives' house please inform us.

(Buses start moving)

Lakshmi:- They say such a deluge happened in 1924. Thomas, is it due to climate change, which people are discussing now a days that triggered this natural disaster?

Thomas:- Sister, I don't know. Only Scientists can explain such things. But one thing I know, generally common people don't seriously take the warnings issued by our scientific research institutions.

Krishnan:- You are correct.

Rajan:- See now we have reached the relief camp. Please get down. First get your name registered. You will be provided with badge and a kit containing toiletries and other essential things. After that you can go to the dining hall.

Thomas:- We shall.

Scene 2

Dining Hall in the Relief Camp People are talking, some children are crying

Mary:- I am very hungry. What are they serving?

Thomas:- Idly, Chutney and Tea

Mary:- Very Good

Ekbal:- Please listen. I am Ekbal, the Village Officer. I am in charge of this relief camp. There are 310 people here. The School Principal, MLA, Division Councilor, Many Government officials, members of many social organizations, NSS volunteers are all here to help you.

Principal:- After your breakfast you will be escorted by the volunteers to your living hall. We have separate halls for ladies and gents. Each of you will be provided with bed materials. Those who want to have dresses please tell the volunteers. They will give you.

Rajan:- One very important information. We have organized several educational and entertainment and cultural activities in the evening, in different classrooms. You can participate in any one of them.

Principal:- Dr Babu, a climate scientist will be visiting the camp in the evening. He will interact with you. Those who are interested can attend.

Krishnan:- Lakshmi, Our house maid's family is also here.

Lakshmi:- Shall we move to your friend Sankar's house?

Krishnan:- No. This is an experience. The rich and the poor are here. People from all walks of life are staying together irrespective of caste, creed and religion. Here all are equal. It is a unique experience.

Mary:- You are absolutely correct sir. Our relatives are staying nearby. But we have decided to stay here. Now let us go and rest till lunch time.

Scene 3

A Class Room in the Relief Camp About 30 people are assembled there

Krishnan:- Thomas did you finish your work in the collectorate?

Thomas:- I took a break. I have to go again. The office is working round the clock. Our state is in a stand still. Rescue operations are going on. The army, navy, air force, fishermen, volunteers are all working hard to save lives. I shall attend this class and go back to my work.

Mary:- As a teacher, I am also eager to attend this class. That is why I did not go to the hall where there is folk dance programme going on.

Rajan:- Ladies and Gentlemen, please listen. All the people, from children to elders are attending or participating in various cultural programmes now in progress in different classrooms. But here we have arranged, what shall I say, an educational programme. Dr Babu, who is a well-known climatologist is here to interact with you. Interestingly, the lane leading to his house is also flooded. As has been said, this is the worst flood, our state is witnessing after a span of almost a century. How it happened? There may be so many reasons. The problem is very complex. Dr Babu will discuss with you some basic facts of climate change. On behalf of august audience here I am welcoming Dr Babu.
(Claps)

Dr Babu:- Thank you Rajan.
Let us start with basics.
What is climate change?
Our world is continuously changing. You see change in weather. Seasons are also changing. Climate also changes. Now, I see a lady standing up to ask me a question. Sister, you are welcome to ask questions.

Mary:- I am Mary, a primary school teacher. I am a victim of this flood.

Dr Babu (Smiling) :- I know, that is why you are here.

- Mary:-** What is the difference between weather and climate?
- Rajan:-** Sir, Shall I answer this question
- Dr Babu:-** Why not?
- Rajan:-** The essential difference between the two lies in measure of time. Weather implies atmospheric condition over a short period of time, while climate is the behaviour of atmosphere relatively over larger periods.
- Dr Babu:-** Yes. Very Good. Larger periods usually mean more than 30 years. The climate of a region also can be defined as its average weather pattern.
- Thomas:-** Can you explain it further?
- Rajan:-** Generally, weather is associated with temperature, humidity, precipitation, cloudiness, brightness, visibility, wind and high and low atmosphere pressure. For example, see today is very cloudy.
- Dr Babu:-** Weather includes, sunshine, rain, cloud cover, winds, hail, snow, thunderstorms, heat waves and so on.
- Lakshmi:-** What about climate?
- One girl student:-** I am doing M.Sc. in environmental science. Let me answer this question. Climate is associated with averages of precipitation, temperature, humidity, sunshine, wind velocity, and other measures of weather that occur over a long period in a particular place.
- Dr Babu:-** Even though this is a small audience, there are few young people who are aware of the subject which we are discussing. I am glad. As the Earth is getting warmer, its climate is changing too, and not necessarily for the better.
- Mary:-** So, what has caused this climate change?
- Dr Babu:-** The answers are threefold. Solar emissions or slow changes in the Earth's volcanic activity caused due to natural internal processes of the earth's system, and human activity since the advent of industrial revolution.
- Rajan:-** All this has changed the composition of the atmosphere, due to air, water and land pollution, resulting in changes of the earth's climate. Is it not sir?
- Dr Babu:-** You are absolutely correct. Remember, we have no control over the first two reasons that have led to climate change. However, by limiting human activities that can emit greenhouse gases, we can make a difference.
- Thomas:-** What is meant by greenhouse gases?
- Dr Babu:-** The temperature of the Earth is determined by the balance between the input from energy from the sun and the reflections of some of this energy back into

space. Certain atmospheric gases are critical to this temperature balance and are known as greenhouse gases.

Mary:- I have heard about greenhouse effect. Can you please explain?

Dr Babu:- I am sure that one of our science students could do that. Is it not?

One student:- I shall sir.

As the Sun's rays reach the earth, they gradually heat up the planet's surface. When the ground becomes warm it begins to emit heat. Some gases in the atmosphere, namely, water vapour, carbon dioxide, ozone, methane and nitrous oxide collectively known as greenhouse gases or GHGs for short trap this heat like a blanket, eventually releasing it to the atmosphere.

Dr Babu:- This natural process of keeping the Earth warm is known as greenhouse effect.

Thomas:- Who coined this term Sir?

Dr Babu:- The term owes its origin to the Swedish Nobel Laureate, Svante Arrhenius, who in the 1890s, suggested that changes in CO₂ concentration could explain temperature variations on the Earth.

Rajan:- A greenhouse – also called glasshouse is a structure with walls and roof made mainly of transparent material such as glass, in which plants requiring regulated climatic conditions are grown. Our Earth is similar to a glasshouse.

Dr Babu:- Greenhouse effect is one of the major factors that determine the temperature on Earth. Without the greenhouse effect, the average temperature of Earth would be a freezing -18oC on an average, making it impossible for life to thrive.

Mary:- When did the issue of climate change come into prominence?

Dr Babu:- Historical evidence suggests that as far back as the third century B.C., the Greeks were having some idea about it. Theophrastus, a student of Aristotle concluded that cutting down trees could bring about changes in the weather. The idea of deforestation and its link with climate change resurfaced in the 17th century, when it was claimed that felling of forests definitely led to rise in temperature in Europe and North America.

One student:- You said, greenhouse effect is essential for keeping the Earth moderately warm, making it possible for life to thrive. So it is good, is it not so?

Dr Babu:- The problem of course is that too much of anything is bad and abnormal increase of these gases can have serious repercussions. When more CO₂ or other greenhouse gases are added this blanket effectively gets thicker and traps more heat, warming up the Earth much like a greenhouse.

Mary:- What is the difference between greenhouse effect and global warming?

Dr Babu:- Though related and oftentimes confused with each other, global warming and greenhouse effect are not the same thing. Global warming refers to a change in the Earth's climate that is causing it to heat up. The greenhouse effect, on the other hand, is a natural process that happens constantly, due to sunlight and the atmosphere. Too much greenhouse effect may lead to global warming.

Krishnan:- When did we discover that mankind plays an important role in climate change?

Dr Babu:- It is a long story. At the far end of the 19th century, Jean Reiset, a French Scientist found that the amount of CO₂ in Paris was higher than that in nearby villages. He used lime water to detect the presence of CO₂. He attributed this to factories, vehicles and homes which emit CO₂ on a large scale.

One student:- Was the amount of CO₂ quantitatively determined?

Dr Babu:- There might have been variations in different parts of the world. But the average CO₂ concentration in the atmosphere at that time was 300 ppm (PPM is parts per million). It was 280 ppm in 1780. One of the ways in which we know that atmospheric CO₂ is important in controlling global climate is through the study of our past climate. By extracting the bubbles of air trapped in the ancient ice, the scientists can measure the percentage of greenhouse gases that were present in the past atmosphere.

Rajan:- I think there is clear proof that levels of atmospheric CO₂ have been rising ever since the beginning of industrial revolution.

Dr Babu:- Yes. No doubt about it. The first measurements of CO₂ concentration in the atmosphere started in 1958 at an altitude of about 4000 meters on the summit of Mauna Loa mountain in Hawaii.

One student:- Why they selected this place?

Dr Babu:- Because it is remote from local sources of pollution. Charles Keeling, an American Scientist, produced the next important step forward, producing evidences in favour of global warming. In the late 1950s and early 1960s, Keeling used the most modern technology available to measure the concentration of atmospheric CO₂ in Antarctica and Mauna Loa. The resulting Keeling CO₂ curves have continued to climb ominously each year since the first measurement in 1958 and have become one of the major icons of global warming.

Krishnan:- How did global warming get the attention of media?

Dr Babu:- It was mostly during the cold war period that much of the fundamental work on the global warming was completed. Gilbert Plass, another American Scientist published an article in 1959 in Scientific American declaring that World's temperature would rise by 3oC by the end of 20th century.

Rajan:- Sir, Our Professor told us that the caption of the article read “Man upsets the balance of natural processes by adding billions of tons of CO₂ to the atmosphere each year”

Dr Babu:- Since then thousands of magazine articles, television news items and documentaries, media debates all appeared.

Mary:- Why was there a delay between the science of global warming accepted and the sudden realization of the true threat of global warming?

Dr Babu:- The key reasons for the delay in recognizing the global warming threat were, first the power of global mean temperature data set and second the need for the emergence of global environmental awareness.

Thomas:- Sir, general awareness about the need for protection of our environment developed immediately after the Earth summit. Is it not so?

Lakshmi:- Earth Summit! What is it?

Rajan:- I shall explain. The Earth summit is the informal name of the United Nations Conference on Environment and Development – UNCED, that was held at Rio-de-Janeiro in June 1992. It had participation from over 178 governments, alongside an estimated 2400 representatives of NGOs.

Dr Babu:- Earth Summit was the follow up action of United Nations Conference on Human Environment held in Stockholm in 1972 June. The aim of that conference was to coordinate global efforts to promote sustainability and safeguard natural environment.

Rajan:- Between 1972 and 1992 a number of international conventions and protocols came into being. There was general agreement on the idea “think globally, act locally”.

One student:- What is UNFCCC?

Dr Babu:- The United Nations Framework Convention on Climate Change – UNFCCC is an international treaty on the environment that evolved during Rio summit of 1992. Convention came into force in 1994. These were part of the international effort for meeting the threat of climate change.

Krishnan:- What is the objective of UNFCCC?

Dr Babu:- Its objective is to stabilize greenhouse gases’ concentration in the atmosphere, at a level that would bring down their adverse impact on the Earth’s climate.

Rajan:- I think you should also mention here about IPCC.

Dr Babu:- Can anyone from the Senior Students say what is IPCC?

One student:- I shall try. The Intergovernmental Panel on Climate Change - IPCC is an international scientific organization. It was formed in 1988 by the United

Nations Environmental Programme – UNEP and the World Meteorological Organization – WMO to study the scientific, technical and socio-economic information for understanding climate change. It also assesses the harmful impacts of climate change and looks for viable solutions.

Dr Babu:- It is now clear to you that a combination of several factors had led finally to the recognition and acceptance of global warming hypothesis. Can we list them Rajan?

Rajan:- One – The science of global warming essentially carried out by the mid-1960s.
Two – The hockey stick upturn in the global temperature data set which was first observed at the end of 1980s.

Dr Babu:- I shall add.
Three – Our increased knowledge in the 1980s of how past climate has reacted to changes in atmospheric CO₂.
Four – Climate modeling using super computers.
Five – The emergence of global environmental awareness
Six – The interest shown by media.
Seven – Politicians and economists started taking part in climate change discussions

Thomas:- What we ordinary people understand now is that climate change has become a global political issue.

Dr Babu:- You are absolutely right. IPCC has published few key reports on climate change in 1990, 1996, 2001, 2007 and 2013. They were discussed very seriously by scientists, economists, activists, governments and politicians.

Rajan:- As a follow up action of Earth Summit in 1992, several conferences were held to take measures on an international level to stabilize greenhouse gas concentrations at a level that would prevent dangerous human interferences with climate system.

Mary:- We have heard about Kyoto Protocol. What is that?

Dr Babu:- To realize the Pledge taken by member countries in Earth Summit to stabilize greenhouse gas concentrations, a treaty was finalized in Kyoto Japan in 1997; known as the Kyoto protocol. It was the first international agreement to stipulate country by country reduction of emission of six greenhouse gases. It came into force in 16 February 2005. But unfortunately, still now there is divide between developed and developing countries on the issue of accepting and implementing Kyoto Protocol. Conference of parties were held at several places – the last one in Paris, but they could not arrive at a consensus.

Rajan:- It is time for our guests to go for their dinner. Sorry we have to wind up for the day. Sir, what is your last comment?

Dr Babu:- Thanks. We must not pin all our hopes on global politics and clean energy technology. So we must much prepare for the worst and adapt. If properly

implemented now a lot of human lives, costs and damage that could be caused by climate change can be mitigated.

Krishnan:- Sir, this requires nations and regions to plan for the next 50 years something that most societies are unable to do because of short term nature of politics.

Dr Babu:- I agree with you. What we can do about global warming we must change some of the basic rules of our society to allow us to adopt a much more global and long-term approach. We need cool solutions for a hotter world. Namaste

Rajan:- Thank you Sir. This is just a beginning. We shall invite you again for more guidance from you. Now friend we shall go for dinner.

All of them together

Thank you sir, Good Night.

Dr Babu:- You are welcome.